

## Altera medical-grade, thin wall, flexible, fluoropolymer heat-shrinkable tubing

Altera MT3000 heat-shrinkable tubing is tough, flexible tubing with a very thin wall construction. It is especially suitable for applications requiring high temperature performance and resistance to abrasion, cut-through, and a variety of fluids. In polar media, such as aqueous systems and alcohols, property retention and dimensional stability are exceptional.

Altera MT3000 tubing provides electrical insulation and strain relief for components that are exposed to high temperatures - either during operation or during sterilization. With its exceptional flexibility and thin-wall construction, Altera MT3000 tubing is ideal for applications where pliancy coupled with small overall bundle size is desired.

Altera MT3000 tubing may be sterilized by radiation, ethylene oxide, and dry heat with no significant change in properties. It is fabricated from materials that meet the requirements of U.S. Pharmacopeia (USP) Class VI plastics (contact with injectables and body fluids or tissue).

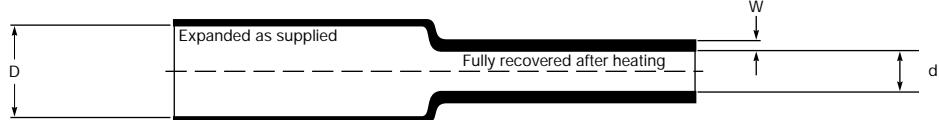
**Temperature rating**

Full recovery temperature:	150°C
Continuous operating temperature:	-55°C to 150°C
Recommended maximum temperature for use as a primary insulator:	135°C

**Specifications\***

Type	Raychem	Material	Master File Number
MT3000	MT3000 SCD	USP Class VI	MAF-472

\*When ordering, always specify latest issue.

**Dimensions (millimeters/inches)**

Size	Inside diameter		Wall thickness		
	D (min.)		d (max.)	W	
	Expanded as supplied		Recovered after heating	Recovered after heating**	
3/64***	1.2	0.046	0.6	0.023	0.25 ± 0.05   0.010 ± 0.002
1/16	1.6	0.063	0.8	0.031	0.25 ± 0.05   0.010 ± 0.002
3/32	2.4	0.093	1.2	0.046	0.25 ± 0.05   0.010 ± 0.002
1/8	3.2	0.125	1.6	0.062	0.25 ± 0.05   0.010 ± 0.002
3/16	4.8	0.187	2.4	0.093	0.25 ± 0.05   0.010 ± 0.002
1/4	6.4	0.250	3.2	0.125	0.30 ± 0.05   0.012 ± 0.003
3/8	9.5	0.375	4.8	0.187	0.30 ± 0.05   0.012 ± 0.003
1/2	12.7	0.500	6.4	0.250	0.30 ± 0.05   0.012 ± 0.003
3/4***	19.1	0.750	9.5	0.375	0.43 ± 0.08   0.017 ± 0.003
1***	25.4	1.000	12.7	0.500	0.48 ± 0.08   0.019 ± 0.003

\*\*Wall thickness will be less if tubing recovery is restricted during shrinkage. \*\*\*Nonstandard size; available by special order only.

**Ordering information**

Colors	Standard	Black
	Nonstandard	White
Size selection	Always order the largest size that will shrink snugly over the component being covered.	
	A variety of special order sizes may be made available upon request.	
Standard packaging	On plastic spools, double-bagged	
Ordering description	Specify product name, size, and color, for example MT3000 1/4-0 (0=Black).	

## Specification values

	Property	Unit	Requirement	Method of test
Physical	Dimensions	mm (inches)	See reverse	ASTM D 2671
	Longitudinal change	percent	+0, -10	ASTM D 2671
	Concentricity as supplied	percent	70 minimum	ASTM D 2671
	Tensile strength	psi (Mpa)	4000 (27.6) minimum	ASTM D 2671
	Ultimate elongation	percent	300 minimum	ASTM D 2671
	Secant modulus (recovered)	psi (Mpa)	50,000 (345) maximum	ASTM D 2671
	Heat resistance (336 hours at 225°C/437°F)			ASTM D 2671
	Followed by test for:			
	Ultimate Elongation	percent	250 minimum	ASTM D 2671
Electrical	Dielectric strength	volts/mil (volts/mm)	500 (19,680) minimum	ASTM D 2671
	Dielectric withstand 3000 V, 60 Hz	seconds	60 minimum	ASTM D 2671
Chemical	Fluid resistance (24 hours at 23°C/73°F) in: Isopropyl Alcohol 5% Saline Solution Cidex*†			ASTM D 2671
	Followed by tests for:			
	Dielectric strength	volts/mil (volts/mm)	400 (15,760) minimum	ASTM D 2671
	Tensile strength	psi (Mpa)	3500 (24.1) minimum	ASTM D 2671
	Heavy metals analysis Cadmium Mercury Lead Bismuth Antimony	ppm	1 maximum (total of all metals)	USP XXII Physiochemical Tests - Plastics

## Typical performance values

	Property	Unit	Performance	Method of Test
Electrical	Dielectric strength** 0.005" < IWT ≤ 0.010"	volts/mil (volts/mm)		ASTM D 2671
	0.010" < IWT ≤ 0.015"		1200 (47,244)	
	0.015" < IWT ≤ 0.020"		1000 (39,370)	
			700 (27,559)	

\*Trademark of Johnson & Johnson Company   \*\*IWT = Installed wall thickness.

†Or equivalent dilute glutaraldehyde sterilizing solution.

Note: Consult the MT3000 SCD for specific details about test procedures.

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**Users should independently evaluate the suitability of the product for their application.**

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